Patent Claims

1. Process for the preparation of polypropylene having an increased content of β-crystalline polypropylene, characterized in that nanoscale iron oxide and polypropylene are mixed and melted at a temperature of at least 150°C and subsequently cooled in such a way that the cooled polypropylene melt has an increased content of β-crystalline polypropylene.

2. Process according to Claim 1, characterized in that a content of β-crystalline polypropylene of greater than 50%, preferably from 70 to < 100%, is produced on cooling of the polypropylene melt.

3. Process according to Claim 1 or 2, characterized in that the cooling of the polypropylene melt is carried out at a temperature in the range 100 – 140°C.

4. Process according to one of Claims 1 to 3, characterized in that the mixture of polypropylene and iron oxide is melted in an extruder, preferably in a twin-screw extruder, at a temperature of from 150 to 170°C.

5. Process according to one of Claims 1 to 4, characterized in that the polypropylene of the mixture is an isotactic polypropylene having a melting point in the range from 140 to 170°C.

6. Process according to one of Claims 1 to 5, characterized in that the polypropylene is a copolymer having a comonomer content of ethylene and/or butylene of up to 10% by weight.

7. Process according to one of Claims 1 to 6, characterized in that the polypropylene is a mixture of propylene homopolymer and propylene copolymer.

8. Process according to one of Claims 1 to 6, characterized in that the nanoscale iron oxide has a mean particle size of less than 50 nm, preferably from 1 to 30 nm.

9. Process according to one of Claims 1 to 7, characterized in that the iron oxide comprises Fe(II) or Fe(III) oxide.

10. Process according to one of Claims 1 to 8, characterized in that the iron oxide has cubic closest packing of the O^{2-} ions.

11. Process according to one of Claims 1 to 9, characterized in that the iron oxide is Fe_3O_4 or Fe_2O_3.

12. Process according to one of Claims 1 to 10, characterized in that the iron oxide is magnetite or maghemite.

13. Process according to one of Claims 1 to 11, characterized in that the iron oxide has been provided with a surface coating.

14. Process according to Claim 12, characterized in that the surface coating consists of long-chain fatty acids, preferably oleic acid or stearic acid, silanes, amines or sulphonates.

15. Process according to Claim 13, characterized in that a mixture of polypropylene and nanoscale iron oxide is prepared, and this mixture is melted and cooled.

16. Process according to Claim 14, characterized in that a compound of polypropylene and nanoscale iron oxide is prepared, and this compound is mixed with polypropylene, melted and cooled.

17. Process for the production of a biaxially stretched flat film, characterized in that nanoscale iron oxide and polypropylene are mixed and melted in an extruder at a temperature of at least 150°C, and the melt is extruded through a flat-film die, and the melt is cooled to give a pre-film in such a way that a content of at least 50% (measured by DSC) of β-crystalline polypropylene is formed, and the pre-film is then warmed and stretched in the longitudinal direction and cooled, subsequently re-warmed and stretched in the transverse direction, and where the temperature during longitudinal stretching is selected in such a way that the β-crystalline polypropylene of the pre-film is converted into the alpha modification of polypropylene.

18. Process according to Claim 17, characterized in that the biaxially oriented film is opaque and porous.